

CASE STUDY: KEELE UNIVERSITY

Working in partnership with Recycling Options, Keele University Students Union trialled a reverse vending machine for the collection of plastic bottles and cans for recycling.



Key facts

- In February 2009, Keele University Students' Union (Keele SU) began a 2-year trial of a reverse vending machine (RVM) to collect plastic bottles and cans for recycling.
- Students were offered coupons in exchange for recycling cans and bottles which could be used to redeem discounts and prizes.

Location

Located just off the M6 in Staffordshire within an hour's drive of Manchester and Birmingham, Keele University is the UK's largest integrated campus occupying a 617 acre estate. In 2011, the University had a student population of 9,800, and 1,700 staff.

Keele University is working towards becoming a hub for sustainability knowledge exchange, using its unique estate to become self-sufficient and carbon-neutral in energy generation and consumption within the next 10 years.

Rationale

As an organisation, Keele SU was keen to build on its success in paper, cardboard and glass recycling, and expand the recycling scheme to include plastic bottles and cans.

The students' union sells over 50,000 bottles and cans per annum, and had searched for some time for a method to enable the empty bottles and cans to be segregated and captured for recycling, rather than being disposed of with the general waste and sent to landfill or incinerated.

Keele SU wanted to ensure that all waste generated on campus was disposed of in a responsible manner. A small recycling unit had been put outside the Students' Union to collect empty plastic bottles and cans but was considered inadequate to collect the volumes of material produced.

In September 2007, staff from Keele University SU Premises and Facilities were guided by a member of the University Estates department to look to a local company and current vending services provider (Options Management Ltd of Newcastle under Lyme) to provide an innovative solution to capture plastic bottles and cans generated on campus for recycling in the form of a RVM.

Scheme overview

The ethos of the RVM relies on students and staff depositing empty plastic bottles (PET - polyethylene terephthalate) and cans into the machine. RVMs scan items and sort according to material type. Once accepted, empty bottles and cans are either

crushed or shredded, and stored inside the machine in separate containers (lined with plastic bags), ready for collection and recycling.

RVMs can also be programmed to incentivise and encourage use. As a reward for their recycling efforts, students and staff of Keele University received a voucher receipt for each item recycled, that could be collected and exchanged for prizes, and tickets to university events (e.g. clothing from Keele SU retail outlets, champagne, and tickets to the annual Graduate Ball). The rewards and incentives were not monetary as the Students' Union decided that these were inappropriate.

When incentives to use the machine were not offered, the volume of cans and bottles deposited was noticeably reduced.

Planning

As Keele University is committed to improving recycling, in line with increased corporate and producer responsibility requirements, the proposed trial of the RVM was supported by University staff and the Students' Union General Manager.

Keele SU owned the area where the machine was to be located, and no further permissions were required prior to siting the reverse vending machine.

It was important, however, that the machine be located in an area where there was high footfall, to ensure maximum use.

Containers

Figure 1: Reverse vending machine in use



Table 1: Details of containers

Number of containers	1
Type of container	Reverse vending machine
Container capacity	800 bottles, 1,600 cans
Make of container	Envipco - supplied by Options Management Ltd
Waste streams segregated	Plastic bottles, drinks cans
Special features	LCD display screen panel for advertisements / local information

The RVM was provided free of charge to KUSU by Options Management Ltd, for the purposes of the trial scheme.

Keele SU was required to purchase liner bags for the interior collection units for ease of material removal.

Signage

The RVM was provided to the Students' Union unbranded, with basic instruction diagrams for users.

The machine 'skins' can be printed with any design according to user specification, and the machine branded to suit any location and need.

Collection and storage arrangements

The maximum capacity of the machine is 800 bottles, and 1,600 cans.

Once the containers inside the machine are full, the liner sacks can be easily accessed and removed from the machine for storage and collection by cleaning staff.

Cleaning staff were also responsible for wiping down the exterior / interior of the machine, to remove any residual liquid that had come out of the bottles and cans.

Options Management Ltd provided a waste collection service for Keele SU, collecting the recyclable material for bulking at their own premises.

Communication

When the RVM was launched it attracted lots of media attention with press releases in the local paper, and promotion on Options Management Ltd website.

The University newspaper also promoted the launch of the machine to coincide with start of Keele University Go Green Week, and a new recycling campaign in students' halls of residence.

Keele SU continued to promote the machine throughout the 2-year trial period and maintained interest in the machine by changing incentives and rewards available.

With the capacity for advertising on the built-in video display screen there is the opportunity to advertise local information and further promote recycling.

Performance, contamination and monitoring

In the first week of operation following the launch, KUSU marketing reported that over 500 vouchers were exchanged for rewards. In the first 4 months of operation, it was reported that over 14,000 containers were collected for recycling.

As the RVM sorts drinks cans and plastic bottles internally, and will only accept what it is programmed to recognise, contamination is significantly reduced. The quality and potential financial value of the output is greater than that of a commingled open RotG collection unit.

Lessons Learned

For Keele SU, the RVM was key to changing students' behaviour and encouraging segregation and recycling of plastic bottles and cans. Siting the machine in an area of high footfall in the Students' Union foyer meant that the machine had high visibility, and was very accessible.

The RVM and Options Management Ltd provided Keele SU with a bespoke solution to the challenges they faced at the time of the trial with regard to source-segregating materials for recycling. Options Management Ltd provided the RVM to the Students' Union free of charge and also offered a market outlet for the collected material.

Rewards and incentive vouchers for recycling were only offered in agreement with Keele SU retail outlets. External sponsorship of the RVM and prizes was the ultimate goal for the Students' Union with a view for the machine to be self-funded, but this was unable to be achieved during the trial period. Over a longer time period, market value of the source-segregated collected material could also help to fund a RVM.

The trial ended in Spring 2009, and the RVM was removed from the site. Following a change in management, vending services are no longer offered within the Students' Union. Keele SU has since implemented a commingled recycling scheme on campus.

Acknowledgements

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**Waste & Resources
Action Programme**

Helpline freephone: 0808 100 2040

E-mail: info@wrap.org.uk



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